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Using this formula, Mr. Chevallier deduces from the Durham observations, May 6, and 10, a mean radius vector which agrees very nearly with that computed by Mr. Graham.

On a Formula for reducing Observations in Azimuth of Circumpolar Stars near Elongation, to the Azimuth at the greatest Elongation. By Captain Shortrede.

In trigonometrical surveys the direction of a chain of triangles is often deduced from the observed azimuth of a circumpolar star at its greatest elongation. The method is convenient, as an accurate knowledge of the time is not requisite, and the latitude is generally sufficiently well known. It is indeed necessary to have the polar distance of the star with the utmost precision. In the northern hemisphere, *Polaris* and δ *Ursæ Minoris* are usually employed.

When the time is known with tolerable certainty, it is much more satisfactory to observe the star frequently, both before and after its greatest elongation, and Captain Shortrede in this memoir gives a demonstration of the formula which he has found most convenient for reducing such a series of observations of azimuth to the azimuth at the greatest elongation.

He deduces an *exact* expression for the tangent of the difference of each azimuth from the greatest azimuth, in which the only variable quantities are, the time from the greatest elongation, and the arc joining the position of the star at its greatest elongation with its position at the time of observation. The formula is easy of computation, and, when many observations have been made, would greatly facilitate their reduction.

Captain Shortrede shews, that in most cases an approximate computation of the principal variable, viz. of the secant of the arc above-mentioned, would be sufficient, and that this may be very readily effected by a formula involving $\log \frac{\text{ver. sin}}{\sin 1''}$: a table of this function for all arcs up to 1^{h} is added to the memoir.

On a Regulated Time-ball.[*] By Professor Chevallier.

"The usual method of indicating the time by a ball is by permitting the ball to fall freely, the motion being a little accelerated at first by a spring. It is evident that this method is subject to some uncertainty as to the particular instant of time which is to be observed. There is also some inconvenience arising from the derangement to which the apparatus is liable by the sudden stoppage of the motion of the ponderous ball.

"It is proposed to remedy these disadvantages by regulating the descent of the ball, so that its motion may be uniform, and causing it to pass through three or five horizontal hoops. The motion may be so regulated that the ball may pass through the distance between

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[*] See p. 16 of the present volume.

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one hoop and another in a determinate interval, as about 20^s; and the mean of the times at which the ball is observed to pass the successive hoops may be taken as in the observation of the transit of a star.

"If the ball is spherical, the time of its bisection by the hoops may be noticed.

"The observer is supposed to be at some distance from the apparatus, so that his eye may not be very far distant from the plane of any of the hoops."

Notice of Errata in Standard Catalogues, communicated by M. Faye.

B. A. C. 3836 *Leonis ; Hist. Cél.* 21467.

"The position of this star in the B. A. C. depends wholly on the observations contained in the *Hist. Cél.* p. 325. It has since been observed by Bessel and by myself. The mean places for Jan. 1, 1848, are,—

	R.A.			Dec.			
	h	m	s	°	′	″	
Lalande	11	6	4·87	+3	4	49·6	Error of 1′ in B. A. C. and *Hist. Cél.*
Bessel			4·81		5	45·6	
Faye			4·73		5	50·1	

Groombridge 1867.

"On comparing the R.A. of this star with *Johnson's Observations*, 1844, and with the *Hist. Cél.*, the position in Groombridge is found to be 35^s in error."

Colonel Batty sent for inspection a curious dial, of the workmanship of Nicholas Kratzer, Horologier to King Henry VIII., and the friend of Holbein.

This consists of a block cut into various faces and hollows, each serving for a dial, mounted on a foot, and furnished with a plumb-line for rectification. There is a hollow on the top, which it is conjectured was meant to receive a compass. The date is 1542, and the arrangement and ornamental work very elegant.

Colonel Batty has supplied the following biographical notice of Kratzer, extracted from Bliss's edition of Wood's *Athenæ Oxonienses* :—

"Nicholas Kratz was born at Munich, and educated at the universities of Cologne and Wittenburg. He came to England with the degree of B.A., was made Fellow of Corpus Christi, Oxford, by Bishop Fox, in 1517, gave lectures in astronomy in that university on the king's order, and was appointed mathematical reader by Cardinal Wolsey.

"He seems to have written several mathematical treatises, which are still in MSS., chiefly in the Bodleian Library. One of

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